

MARITIME HERITAGE MINNESOTA

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Developing a Plan to Preserve the USS *Essex*



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DOCUMENTATION, CONSERVATION, AND PRESERVATION OF MINNESOTA'S
FINITE MARITIME CULTURAL RESOURCES

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Introduction

The USS *Essex* is arguably Minnesota's most historic shipwreck. First and foremost, the *Essex* is the last vessel, military or commercial, that was built by the master shipbuilder Donald McKay. The clipper ships built by McKay were renown worldwide for their speed, and their record-setting voyages were seen as national triumphs. One clipper ship, the *Flying Cloud*, set a record in 1854 for fast passage from New York to San Francisco that stood until 1989 (*New York Times* 1989). McKay's fast clipper ships were only one expression of this man's brilliance; his packet ships were also known for their quality of construction. The fact that this man built ships for the British merchant fleet at a time when Britain was considered the preeminent shipbuilder of the world, is a testament to the high regard that McKay was held (McKay 1995, ix-xvi).

Secondly, USS *Essex* is the only surviving fragment of a steam with auxiliary sail US Navy vessel built in the late 19th Century. This was a period of technological stagnation often called the 'Dark Ages' by US naval historians. However, unarmored US Naval ships like the *Essex* were not entirely deficient when compared to similar contemporary foreign designs, and were actually well designed for their mission of maintaining a cruising presence worldwide. Iron hulls of the period were at a disadvantage due to their tendency to quickly foul with marine growth (Canney 1990, 164-165).

Thirdly, *Essex* belonged to the last class (Adams) of wooden hulled US Navy warships and she is the only post-Civil War wooden US Navy warship known to exist. As mentioned earlier, in the late 19th Century wooden hulls were not seen as entirely obsolete for worldwide cruising. Iron hulls of the period tended to be brittle and prone to lethal splintering when struck by shot. The *Essex* was built during a transitional period where the Navy relied on steam-powered ironclads for coastal defense and worldwide cruising was the domain of wooden hull ships with sails as the main mode of propulsion (Canney 1990, 156, 164-165).

Fourthly, the wreck that currently lies in the surf zone of Duluth, Minnesota's Minnesota Point is the only known fragment of a Donald McKay-built vessel. There may be undiscovered McKay-built ship remains elsewhere, but as of 2010 the 56-foot long fragment of the USS *Essex* is the only known physical evidence of McKay's handiwork. Minnesota has on its shores a major piece of the maritime heritage of the United States.

This national maritime treasure is in danger. Even a cursory examination of the wreck's condition over the years show that it has deteriorated from wave, ice, and human action. A plan is needed to ensure that this wreck fragment is not destroyed. What will be presented here is a brief history of the *Essex* up to 2010. Then preservation options for the *Essex* will be discussed and they will be presented from the least expensive to the most expensive. Conservation methods will then be discussed, followed by NRHP and NHL issues. Finally, a list of archival sources will be presented that may aid future researchers. Although it is not possible to get an exact cost estimate at this stage, this essay will serve as a guide for what needs to be done in order to preserve the USS *Essex*.

USS Essex History

The United States Congress, on 10 February 1873, passed “an Act to authorize the Construction of eight Steam Vessels of War, and for other Purposes” that directed the Secretary of the Navy to build these vessels with “auxiliary sail–power, and...in his judgment will best subserve the demands of the service, each carrying six or more guns of large caliber.” Four of the ships would be built through private contracts with full plans and models to be submitted for approval to the Secretary. Four of these naval vessels, constructed of wood and measuring 185 feet long, 35 feet in the beam, with a 14.30–foot draft, and weighing 1,375 tons would comprise the *Adams* Class of screw sloops: *Adams*, *Alliance* (laid down as *Huron*), *Enterprise*, and *Essex*. Another ship was also considered to be of the *Adams* Class, the *Nipsic*, a re–build of the dismantled, smaller, 592–ton gunboat *Nipsic* (*Congressional Globe* 1873, 423; Navy Department 1959, 1963, 1970).

Famed clipper ship designer and builder Donald McKay won the contract to construct the USS *Essex* and USS *Adams*. McKay was renowned for designing and building the fast ships *Stag Hound*, *Flying Cloud*, *Sovereign of the Seas*, and 46 other large sailing vessels between 1845 and 1853. In 1853 McKay designed and built the largest of the clipper ships, the *Great Republic*. McKay constructed this 325–foot long four–masted bark as his entry into Atlantic merchant shipping. A fire at the *Great Republic*’s New York dock prematurely cut short the career of this vessel (Shaw 2006, 46–47, 51, 53–54).

McKay returned to his Boston shipyard and continued to design and build clipper ships, although the late 1850’s economy was sluggish and the demand for new ships was low. To improve his business, McKay took on contracts with the US government to build *Casco* Class monitors *Nausett* and *Squanto* before the end of the Civil War. He then returned to building sailing ships, including the impressive *Glory of the Seas* in 1869 and doing the re–fit for the famous racing yacht *America* in 1875 (Anfinson 1996, 98; Navy Department 1970, 1976; Shaw 2006, 58).

McKay won the contracts to construct the *Essex* and *Adams* in 1873 and laid down the *Essex* at the Kittery Navy Yard in Portsmouth, Maine and the *Adams* at the Boston Navy Yard. Atlantic Works of Boston manufactured the steam engines and boilers for *Essex* and *Adams* for \$175,000 and \$163,000 respectively. *Adams* was commissioned on 21 July 1876, with *Essex* following on 3 October 1876, *Alliance* on 8 January 1877, *Enterprise* on 16 March 1877, and *Nipsic* on 11 October 1879. *Adams* Class ships were bark–rigged to augment their engines, with a top speed of 10–11 knots using the combined power of sail and steam (Bennett 1896, 647; Canney 1990, 156; Bennett 1896, 647; Navy Department 1959, 1963, 1970).

Naval Service 1876–1893

Commander W S Schley reported with his new ship USS *Essex* to the North Atlantic Squadron in 1876, thus beginning a long, active career for Donald McKay’s last ship.

Over the years, *Essex* served at various times in the North Atlantic Squadron (1876), the South Atlantic Squadron (1877, 1891-1893), and the Asiatic Station (1882-1884, 1891-1893). A long voyage of the *Essex* was of considerable interest during her 1882–1884 assignment to the Asiatic Station. After she was fitted out in November 1881 in Philadelphia, *Essex* set out for a 38–month voyage to Asia, with stops in West Africa, the Virgin Islands, and in Uruguay by 16 May 1882, where she was laid up for almost a month due to a crankshaft defect. After repairs *Essex* continued on through the Straits of Magellan and dropped anchor in Caliao [Callao, Peru] in October, where she stayed until March of the following year. By 18 June 1883, *Essex* reached Honolulu and stayed in the Sandwich Islands until 8 July, when she set out for Yokohama, Japan, making this Pacific Ocean crossing of 3,865 miles non–stop. *Essex* moved from port to port throughout the Japanese Islands, leaving for China on 27 November. *Essex* headed back toward Japan, stopping in Hong Kong on 3 March 1884. While in Hong Kong, Captain McCormick met up with the second mate of the American ship *Ranier*. This officer was in charge of a 20-ton schooner that had been manufactured from the remains of the *Ranier*, wrecked in the Marshall Islands. The schooner and her crew of 10 were sent off from the Marshall Islands to seek assistance for the other 10 Americans left behind. *Essex* then stopped in Nagasaki, and then headed to the Marshall Islands on 20 March. At the island of Ujai, she took on board the rest of the survivors of the *Ranier*, the group being in fine shape, having been treated very well by the island’s king and his people. Captain McCormick directed his ship and crew back to Nagasaki then Hong Kong before setting out for Singapore. *Essex* then set out for Java, arriving on 13 September, and then was directed to Mozambique to “investigate a claim of the Portuguese that an attempt was being made to evade the customs laws on the cargo of the ship *Wheatland*, owned by Ropes & Co., of Boston. The *Sicilian*, another ship of the same line, had been condemned, and her cargo had been transferred to the *Wheatland*.” After looking into the *Wheatland* situation and preparing a report to the Department of the Navy upon his return to the United States, *Essex* stopped at Cape Town, St. Helena, and St. Thomas before docking in New York on 30 December 1884, completing her around–the–world assignment (*New York Times* 1884a, 1884b).

USS *Essex* in the late 1880s (Naval Institute).



The *Essex* operated during a transformational period in the US Navy, where steel-hull steam powered warships replaced the wooden-hull auxiliary sail vessels. Beginning with reports in 1887, the Navy determined that the active wooden–hulled Navy was waning in importance. Many wooden hulls Navy ships were being condemned, sold, or used as

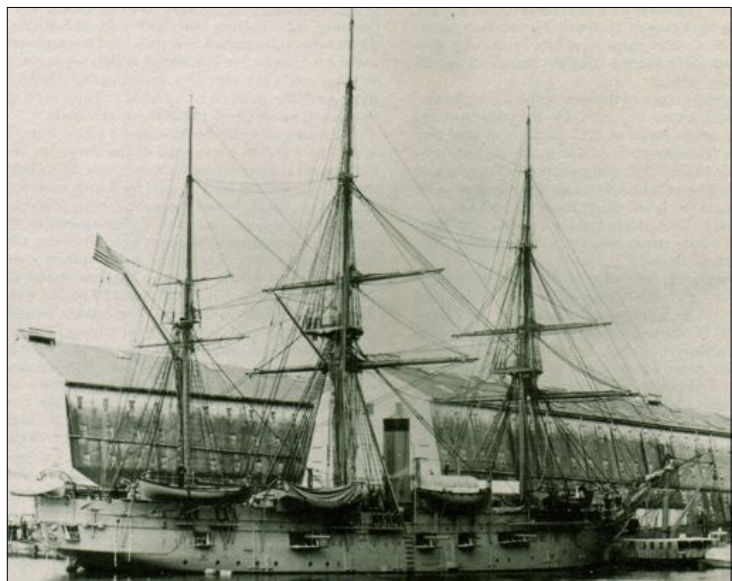
training or receiving vessels (Navy Department 1891, 294). For the next ten years the *Essex* would perform valuable service as a training vessel.

Training Ship Era 1893-1903

In April 1893 *Essex* was ordered to replace her sister ship *Enterprise* as a training ship in Annapolis, where she would “serve as a gunnery instruction ship to the naval cadets” for a three-month cruise. She was then ordered to Philadelphia in August 1893 to become a receiving ship, replacing the old *St. Louis*, built in 1828. However, *Essex* was again assigned to be a training ship for Navy personnel beginning in January 1894. It was reported that what was considered the “old corvette *Essex*...has been converted into an apprentice training ship, and into something resembling a modern cruiser at the same time.” The conversions referred to are the replacement of her cast-iron smooth bore cannon with a series of rapid-fire breech-loaded guns. This change permitted the training cadets to gain experience with the most modern guns of the time, ones that they would encounter when on a modern Navy cruiser (*New York Times* 1893a-b, 1894; Navy Department 1963; Naval Historical Center, *Essex* File).

USS *Essex* made several training cruises over the years along the East Coast and across to England, France, Sweden, Ireland and Denmark. One training cruise had an unfortunate accident. In 1895 *Essex* was sent out once again on a cruise to Europe to train Naval cadets, stopping in Southampton, England, where the city’s mayor and other dignitaries greeted the ship and crew. An accident occurred when “a salute was fired by the *Essex*. Some pellets of burning powder somewhat severely injured the Mayor and grazed others in the launch”. In April 1898 the *Essex* was decommissioned at Portsmouth ME, thus freeing her crewmembers for service on more modern Navy ships as the US entered into war with Spain. She was re-commissioned promptly in September after the end of hostilities (Naval Historical Center, *Essex* File; *New York Times* 1896b).

USS *Essex* in 1898 (Naval Institute).

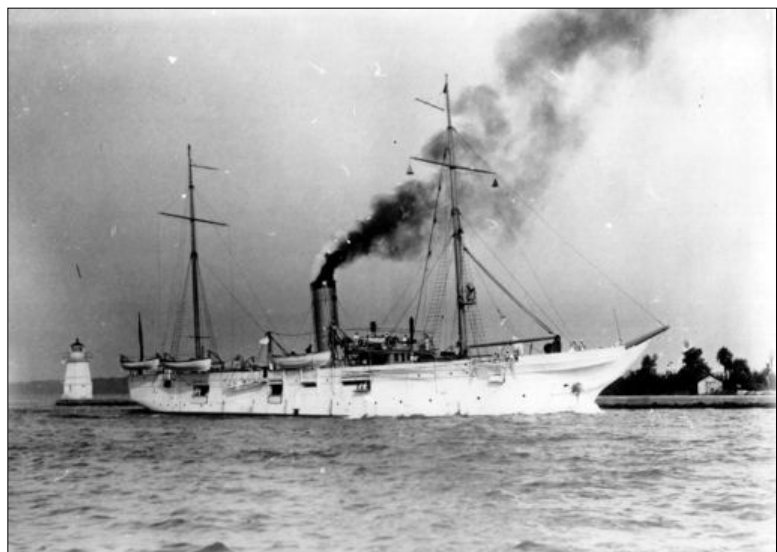


USS *Essex* continued in her training service, and in late August 1903 participated in war games off of Portland, Maine. She was part of the flotilla led by the USS *Kearsage*, along with battleships *Illinois*, *Alabama*, and *Texas*, and several cruisers and gunboats. Although at one point the Naval fleet was determined to have been “sunk” by the Army’s shore batteries, they ultimately won the day with the capture of Long Island according to the Board of Referees (*New York Times* 1903).

Great Lakes Training Ship 1904-1916

“The famous old battleship *Essex*” as the *New York Times* dubbed her, was transferred to Toledo, Ohio in 1904 to serve with the Ohio Naval Militia. Carrying 300 Toledo Naval Reservists, she traveled to Ohio from the Portsmouth Navy Yard in Maine, where Donald McKay constructed her hull, down the St Lawrence River and the Canadian canal system. Because of this canal use, her 10 guns were sent to Toledo by rail car. In 1904, USS *Essex* was the second largest vessel to travel through Canada’s canal system with her 14.30-foot draft, and “all [water] levels had to be raised to float the *Essex*. She is barkentine rigged, has three masts, and registers fourteen hundred tons. The hull is twenty inches thick below the water line and fifteen above”. After a long, arduous journey fraught with fog, storms, groundings, a drowning and low provisions the *Essex* finally arrived in Toledo August 7 after a 2,000-mile journey. The next six years were spent training Ohio Naval Militia men, often in the company of the USS *Michigan*, which was the Navy’s first iron-hull warship. But the *Essex* was showing her age. She was taken into the Toledo Shipbuilding Company’s dockyard in 1910, emerging as an almost entirely different ship. Her compound engine was replaced with a triple-expansion type, and her four Scotch fire-tube boilers were replaced with two Babcock & Wilcox water-tube boilers. The *Essex* also lost her three wooden masts, which were replaced with one fore and one mizzen hollow steel pole masts. She then resumed her militia training duties (National Archives and Records Administration [NARA] RG 19, File 2280 Encl. 136; *New York Times* 1904a; *Toledo Blade* 1904b-m).

USS *Essex* after her 1910 refit (Naval Institute).



Beginning mid-July 1913, *Essex* and her reservists participated the Perry Centennial. This entailed acting as an escort for the *Wolverine* and her ward, the raised and re-built historic brig USS *Niagara* from the War of 1812. This group was occasionally assisted by other state militia vessels, and toured around Lake Erie for the summer months. *Essex* resumed to her training duties in August. In 1917, the Navy transferred *Essex* to the Ninth Naval Reserve District, headquartered in Chicago. Available evidence of her activities during the years 1917-1918 and most of 1919 is currently unavailable to MHM (pending MHM's research of her logbooks), but in November 1919 the costs of maintaining *Essex* became a serious consideration for the Navy because of the expenses incurred during World War I. The Navy offered *Essex* to the Minnesota Naval Militia in November 1919 with the hope that the Federal Government would not incur any expense for her maintenance. Unseasonably cold weather made the passage of the vessel through dangerous ice impractical in late 1919, so Captain Guy Eaton of the Minnesota Naval Militia in Duluth suggested that the transfer of *Essex* occur after ice-out in Spring 1920 ((Anfinson 1996, 100; Eaton 1919; Navy Department 1963; *New York Times* 1913b-h; Ninth Naval District 1919; Yaple 1913, 135-136).

Naval Militia Training Ship in Duluth 1920-1921

The ship's arrival in Duluth on 26 May 1920 caused excitement among the city's citizens and the USS *Essex* was the subject of newspaper reports the following day. Referred to as a cruiser, the *Essex* was welcomed by the whistles of the factories and mills that dotted the Duluth shoreline as she tied up at the Fifth Avenue dock. Representatives of the city's Commercial Club and other local dignitaries greeted her crew, a group comprised of Minnesota Naval Militia members. It was noted that *Essex's* arrival in the city marked the beginning of the establishment of a Naval center in Duluth. Eaton remarked that while "Essex will be stationed off the naval militia boathouse for the present....Eventually she will be housed over and converted into a receiving ship, but not beached". Further news of *Essex's* future appeared in the public realm with an announcement of her planned 1920 summer cruise and the establishment of the Naval Training District head office in Duluth (*Duluth Herald* 1920; *Duluth News Tribune* 1920a-b).

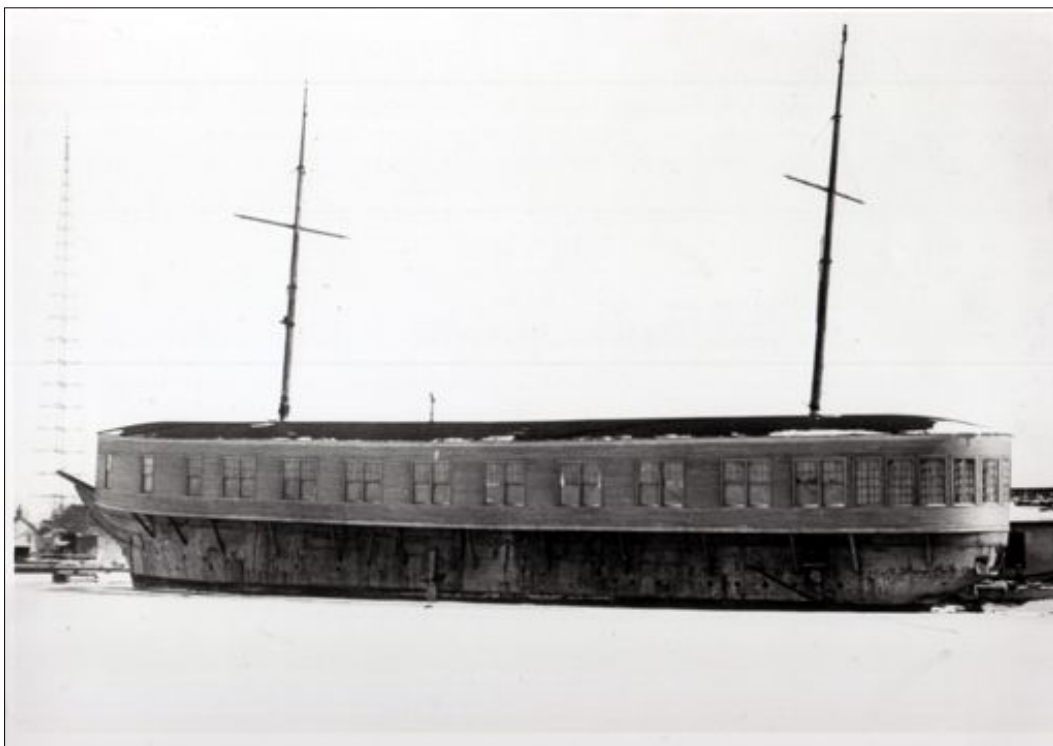
During her fourth cruise in 1921, *Essex* underwent a thorough inspection by the Chief of the Bureau of Navigation, Thomas Washington. Washington determined that "the general condition of this vessel both as to material and personnel reflects great credit upon the organization, and the Board is of the opinion that special commendation is due the Commanding Officer, Executive Officer, and Engineering Officer. This vessel is old and her equipment is obsolete." Washington recommended that while *Essex* was a fine ship and her crew worked her well, a more modern vessel was required for Naval Militia and Naval Reserve training. Also during this cruise, *Essex* and her crew won *First Honors* during Chicago's *Pageant of Progress* (Eaton 1922; *Duluth Herald* 1921b; Washington 1921).

USS *Essex* conducted two more cruises after the Chicago *Pageant* and her sixth training session ended on 2 October 1921. The six completed cruises totaled 6,959

miles and *Essex* stopped at Ashland, Bayfield, Madelyn Island, Hancock, Chicago, Mackinac Island, Sault Ste Marie, White Fish Point, Detroit, and cruised along the North Shore of Lake Superior. She hosted 263 crewmen and 33 officers drawn from the Minnesota Naval Militia, many whom were also members of the US Naval Reserve Force (Eaton 1922).

Station and Receiving Ship in Duluth 1922-1930

Regardless of the impressive performance of USS *Essex* during the 1921 cruising season, another ship was assigned to act as a training vessel for the Minnesota Naval Militia in early 1922. As Minnesota Governor Preus pointed out, the *Essex* was originally assigned to the Minnesota Naval Reserve in Duluth as a Station Ship, and therefore he requested the transfer of the USS *Paducah* to Minnesota to act as a training ship. *Essex* would be transferred to the State of Minnesota with the status of receiving ship and armory. By 8 November 1923, MISBC had completed their contract to erect a housing over the *Essex*, and were paid \$9,080.00 for their efforts. Other alterations to *Essex* continued, making her suitable for habitation by Reservists and as storage and other usable space for the Naval Station. A steel smokestack for a steam heating plant was put in place on 28 October 1924 for \$156.00, and pipe and boiler insulation on 24 January 1925 for \$112.50 by MISBC. The Paine & Nixon Company also completed installation of her new windows on 18 February 1925. Beginning in December 1925 and at least through mid-March 1926, a caretaker was assigned to *Essex* with William M Crosby collecting \$26.25 every two weeks for his services (Minnesota Naval Militia 1910-1924, 99; 1924-1926, 5, 7, 8, 17-19; Preus 1922).



USS *Essex* housed over as a receiving ship in the 1920s (Northeast Minnesota Historical Center).

In mid-1927 the US Navy decommissioned *Essex* one final time on 20 August and officially loaned her to the State of Minnesota (Crosley 1930). This action did not affect the 'operations' of the ship in any way since she was simply acting as storage space, berthing for Naval Cadets, and other uses as needed by the Naval Militia. She had not moved since mid-1922 and had been housed over in November 1923.

By late 1929, Commanding Officer A O Rabideau of the Minnesota Naval Militia was in contact with the Commandant of the 9th Naval District W S Crosley concerning the structural stability of USS *Essex*. Crosley was informed that Minnesota's Adjutant General Ellard A Walsh would confer in person with Rabideau in order to determine what action, if any, would be taken to secure *Essex* in Duluth. Rabideau related that beginning in spring 1929 after ice-out on Lake Superior, leaks were so significant along *Essex's* outer hull planking seams that her caretakers were barely able to keep her afloat. An outer hull inspection during the winter months in late 1929, when the ice allowed convenient access to her hull at the waterline, revealed considerable damage to the ship. Rabideau and the Walsh agreed that if the Naval Militia did attempt to fix her, the cost would be prohibitive and further expenditures on the *Essex* were not in the best interests of Minnesota (Rabideau 1930a-b; Walsh 1930a).

An inspection of the hull of the *Essex* by the US Navy's Board of Inspection and Survey was conducted on 8 April 1930. The Secretary of the Navy Charles F Adams took the recommendations of the Board of Inspection and Survey, Rabideau, and Walsh and placed *Essex* "on the list of naval vessels to be disposed of by sale as a hulk at an appraised value of \$3,000.00, after the removal of such items as are either the property of the State of Minnesota, or are desired by the Bureaus concerned" (Adams 1930).

Details of the *Essex* deconstruction by the Naval Militia and the Naval Reserve are not readily accessible, but it was documented in early September that her heating plant was removed and installed in the Minnesota Naval Militia's boathouse for use there. By mid-November 1930 the Navy announced that *Essex* was going up for auction and she would be sold "to the highest bidder adjudged capable of treating her kindly in her old age" on 17 December 1930. The winning bid of \$410.00 was made by the Klatzky Iron and Metal Company (Carhart 1930; *Duluth News Tribune* 1930b, *Toledo Blade* 1930).

Dismantled and Burned in Duluth 1931

Klatzky's workers began to dismantle USS *Essex* at the State pier during the winter of 1930-1931 and they sold the wood components of the deck enclosure to Duluth's Willy Lumber Company during this time. At ice-out in April, Klatzky towed *Essex* to the Soo Line dock in Duluth located at 7th Street West, where her deconstruction continued.

During her dismantling, the Klatzky firm stripped *Essex* of the equipment that they deemed re-usable that included any small machinery that had been left inside the hull by the Naval Militia or Naval Reserve, and all retrievable brass, copper, and metal fasteners and fittings. When completed, the Klatzky firm towed *Essex* through the Superior Harbor entrance to the end of Minnesota Point on the lake side in preparation

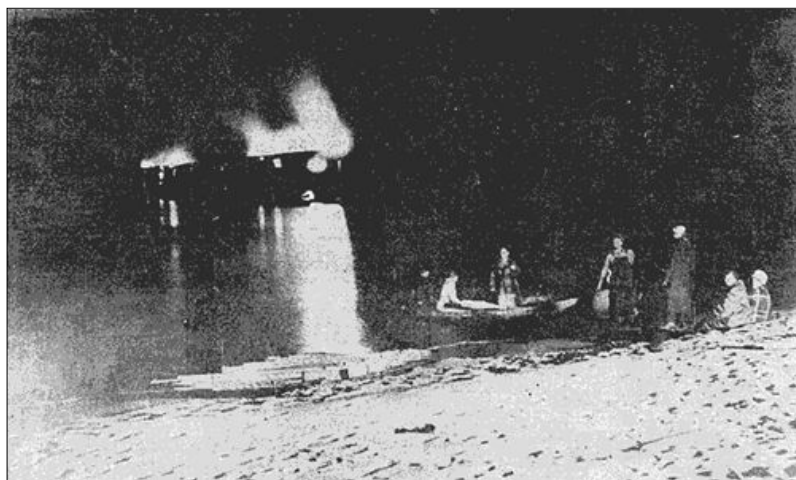
for her burning on 14 October 1931, if favorable winds allowed, and grounded her near shore (*Duluth Herald* 1931a-b). The planned burning would further increase the amount of scrap metal for recovery since *Essex's* hull above and below the waterline contained a considerable amount of copper fasteners and large iron spikes for internal machinery attachments that would be easier to retrieve once the wooden hull was gone.

USS *Essex* was held fast in place by two thick steel cables by order of the US Government so that she did not become dislodged by a strong wind. Having been draped along her gunwales with an oil-soaked tarp and with her deck and hold sprayed with 200 gallons of oil and kerosene, Mrs. J H Peabody of Superior, Wisconsin, the daughter of one of the area's earliest settlers, set *Essex* ablaze at 6:19 in the evening on 14 October 1931. Within minutes, witnesses reported she was burning from stem to stern. Few people witnessed the ship's burning but included in the group were an *Evening Telegram* photographer and reporter from Superior, along with a few area residents from both Wisconsin and Minnesota. *Essex* burned throughout the night and into the next day when she had burned to the waterline. Twelve feet of the vessel's bottom was still intact below the water and using a winch, the Klatzky workers dragged her further onto shore in order for her to continue to burn (*Superior Evening Telegram* 1931). After salvaging as many metal spikes as was economically feasible the wreck was left to rot.

A dismantled USS *Essex* off Minnesota Point, prior to burning (*Superior Evening Telegram* 1931).



USS *Essex* burned throughout the night of 14 October 1931 (*Superior Evening Telegram* 1931).



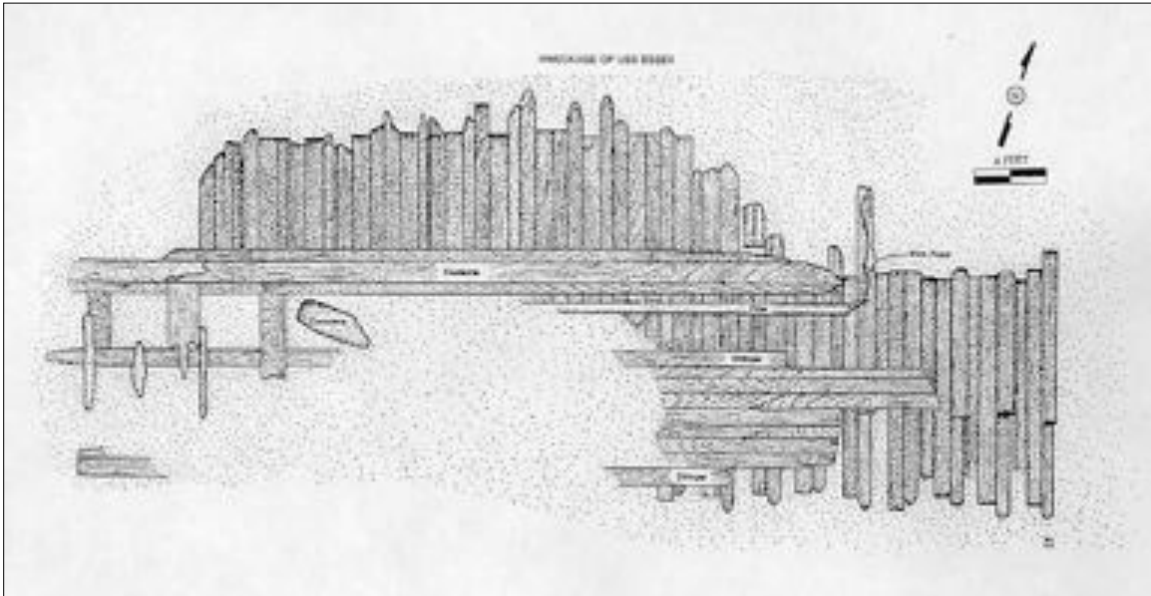
Post 1931 Documentation

There is little known information regarding the condition of the wreck between 1931 and 1988. Elmer Engman took a series of photographs of the *Essex* wreck site in 1988. The wreck was mostly above water and largely exposed, with a large engine mount timber prominently featured over the keelson. A stringer on one side (MHM thinks this is the starboard side) is also visible, with two large spikes bent over towards the keelson. Three and possibly four frames (later identified as engine mounts) can be seen protruding from the sand on the port side of the wreck.



The USS *Essex* wreck site in 1988 (Courtesy of Elmer Engman).

Panamerican Consultants Inc (PCI) documented the wreck in 1992. This assessment was implemented by the Minnesota State Historical Society to evaluate four Lake Superior shipwrecks for inclusion on the NRHP. Two days were spent on the site, which at that time was half-submerged and partially covered in beach sand. The result was the first map of the wreck since it was burned in 1931. The survey also enabled the *Essex* to be successfully entered into the NRHP in 1994 (James 1992, 22-23).



USS *Essex* wreck site plan (Panamerican Consultants 1992).

In 1998 the USACE notified the Minnesota State Historic Preservation Office (SHPO) about their intent to dredge the Superior, Wisconsin entry and part of the harbor basin. The dredge spoil was to be dumped along southern areas of Minnesota Point as beach nourishment. Since the *Essex* site was in the area of dredge material placement it was ultimately decided that burying the wreck was the best course of action, provided measures were taken so that the actual process would not harm the wreck. The USACE would not dump directly onto the *Essex* but near it, allowing natural wave action to cover the wreck. The USACE would also undertake to monitor and report the status of the wreck every two years. Dredging was completed by October 1998. In 2000 a status report was filed by the USACE, stating that the *Essex* was outside the initial dredging deposit areas and was not directly impacted. It was expected to become covered by the deposited material, but would in due course become exposed again. Further dredging/beach nourishment occurred in late summer of 2002 (State Historic Preservation Office 2000, 2002).

MHM made three visits to the site in 2005 but was unable to locate the wreck. However, in September 2007 MHM staff and volunteers found the wreck had been partially uncovered. Only about half of the wreck was exposed in about three feet of water. In August 2008 MHM investigated the wreck three times. The first visit confirmed that the wreck was exposed, but high wave conditions over the wreck made further investigation impossible. The next two visits found the *Essex* had become almost entirely exposed. The entire wreck was beneath 2 to 4 feet of water, in contrast to the 1992 visit by PCI where the wreck was partially exposed above the water. The port side, which was mostly buried in 1992, was completely exposed with the edge of outer hull planking uncovered. The wreck was videoed and photographed. By October 2008 the *Essex* was almost completely covered over again. Another visit by MHM in May 2009 showed the wreck to be mostly buried in the sand, with portions of the keelson and starboard side

exposed. However, a USACE dredging and beach nourishment project caused the wreck to be buried in June 2009 and as of June 2010 the wreck remains deeply buried. Subsequent research by MHM of ship plans at NARA has shown the area under the boiler room was filled with concrete. The pieces of concrete currently lying in the wreck indicate that the hull fragment may belong to that area (*Duluth News Tribune* 2009; NARA RG 19).

USS *Essex* port side frames in 2008
(Maritime Heritage Minnesota).



Summary of Impacts on the USS *Essex*

Overall, the USS *Essex* wreck site has undergone structural degradation. The most obvious example of this occurred between 1988 and 1992. In the 1988 photograph a large machinery mount timber is visible sitting on top of and attached to the keelson timbers. The bulk of this timber, which also was the tallest portion of the wreck, extended off to the port side. This large timber is missing by the time of the PCI survey, as shown in the 1992 PCI site map and photographs taken at that time. A stringer is visible in the 1988 photograph as well, located on the starboard side with two bent pins protruding through it. This stringer is no longer seen in the 1994 PCI site map and photographs. Also visible in the 1988 photograph and in the 1992 PCI site map & photos are a series of large timbers protruding from the sand. Three timbers are located on the port side, closest to the shore. They are identified in the PCI report as engine mounts. Two of these timbers are present in 2008, but are largely worn down. The engine mount timber closest to shore is missing, although the frame it rested on is present.



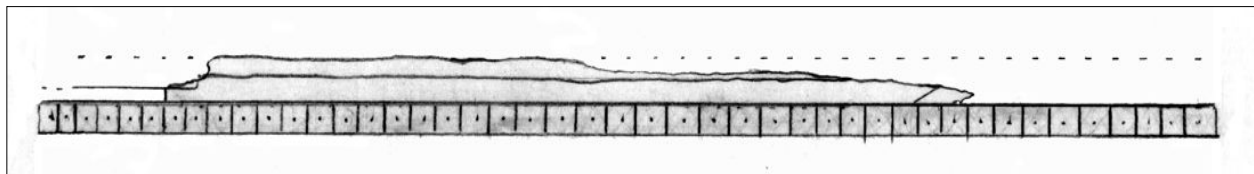
The timbers circled in the above photograph from 1988 have disappeared from the wreck since that time (Courtesy of Elmer Engman).

The keelson shows the most damage from the elements. The surface of this timber is shown in the 1988 photo to have a relatively smooth surface of uniform height along most of its length aft of the large engine mount timber (now missing). The prominent height of the keelson in relation to the starboard sister (side) keelson is also visible in the photograph.



The circled areas indicate the keelson in 1988 (Courtesy of Elmer Engman).

In 2008 the keelsons top surface is worn down to the level of the adjacent sister keelsons for about half of its length. This wear progresses below the original top level of the sister keelsons at the very aft end of the extant keelson. The worn, rough nature of the top surface of the keelson supports the theory of wave and ice damage.



Port side view of the USS *Essex* wreck, showing degraded state of keelson from bow (L) to stern (R). The dotted line shows original keelson height. Frames are shown in cross section by boxes with dots in the middle (Maritime Heritage Minnesota).

In summary, the wreck of the *Essex* has undergone significant changes while in her current location. These changes are mostly due to acts of nature, although cut marks on some of the copper alloy fasteners are evidence of human relic hunting. The report by Panamerican Inc mentions evidence of chain saw, axe, and pry bars marks on the wreck (James 1992, 22). Steps should be taken to ensure that the last example of a Donald McKay ship does not disappear forever.

Preservation Plans for the USS *Essex* Wreck Site

As decreed by the Abandoned Shipwreck Act of 1987 (ASA), the remains of the *Essex* belong to the Minnesota State Government. US Naval ownership does not apply here, since the vessel was transferred to the state in 1927 (Crosley 1930). The Minnesota OSA and the SHPO with the NRHP staff will make final determinations if the USS *Essex* stays in place or is moved.

However, there are additional entities that should be consulted if the *Essex* is moved. Officials of the City of Duluth should be consulted for possible display locations. The Great Lakes Aquarium (GLA) may have space for an indoor display, or negotiations with the Duluth Entertainment Convention Center (DECC) may produce a display location. The Great Lakes Maritime Museum Association, the entity that operates the Lake Superior Maritime Visitors Center, has board members that may provide useful contacts and the USACE should also be consulted regarding recovery or burial of the *Essex*.

The options recommended for the preservation of the *Essex* are listed in the order of the least to the most expensive. For any of these options to take place sources of funding must be found. There are many past preservation projects that were hamstrung due to little or no funding, and that had to cut corners that caused irreversible damage to the artifact or structure they were meant to protect. The CSS *Neuse* and USS *Cairo* are examples of such misfortune. Once a plan to preserve the USS *Essex* is decided upon a detailed cost estimate can be made that would aid in fundraising efforts.

Some potential sources of funding are:

- Minnesota's Clean Water, Land and Legacy Amendment
- National Endowment for the Humanities
- Save America's Treasures Program, although continued funding is in doubt for FY 2011
- The National Trust for Historic Preservation has programs that may apply
- The Bush Foundation

An organization, preferably a non-profit, can be formed or brought in for the purpose of saving the USS *Essex*. A non-profit organization has the advantage of being eligible for grants from Federal and private sources, as well as providing tax incentives for donors. A non-profit can also partner with another public or private organization for additional pooling of resources. It may even be decided that the non-profit could gain ownership of the wreck. Caretaking issues would need to be thought out, however. For example, what would happen to the *Essex* if the venue it were displayed in went bankrupt? Such details should be worked out early. Again, the SHPO and the OSA need to be involved and would review any plans.

In the following options a distinction is made between **preservation** and **conservation**. Normally these words essentially mean the same thing. In this work preservation, as it relates to the *Essex*, means maintaining the wreck in her current submerged or wet

state. Conservation in this context is referring to the process of stabilizing the wood so she can be displayed in a dry state. There are six options recommended for the preservation of the USS *Essex*, and are listed below in the order of the least to the most expensive. In all these options, except option 1, the wreck would have to be de-listed from the NRHP. However, it can be re-listed if it is preserved in a waterfront setting. (National Park Service 1992, 8-9)

Option 1: Leave the USS *Essex* in place with periodic burial

This option would entail leaving the *Essex* in place and at regular intervals covering her up with material dredged from the bottom of the harbor. Periodic monitoring of the wreck site would be required to make sure the *Essex* remains totally covered by the sand.

The necessities of Option 1:

- Funding must be in place before this option is acted upon.
- Documentation of the extant structure of the USS *Essex* is necessary prior to burial to provide a baseline for future monitoring of her condition. An earthen or sheet metal cofferdam may be needed if the wreck has been recently buried by sand from a harbor renewal project and then the wreck would be excavated with a water dredge. If the wreck was mostly exposed through natural wave action, then daily removal of overburden by water dredge may be sufficient and a cofferdam not needed.
- The actual wreck documentation must be conducted by professional Nautical Archaeologists and would entail two weeks of fieldwork if no cofferdam is used. The *Essex* would be mapped in as much detail as possible including her fasteners, spike patterns, the condition of each frame, etc., will need to be documented. The underside of the wreck will not be documented and photographs and measured drawings will be done at this stage.
- The wreck would then have sand dumped near her, but not on her, keeping with the agreement between the OSA and the USACE (State Historic Preservation Office 1998). Natural wave action would then cover the wreck with sand rather quickly.
- After burial the *Essex* must be monitored to ensure she stays entirely covered. Past experience suggests that 2 years minimum passes before the wreck starts to emerge from the sand. Monitoring the burial status of the wreck would require visitation to the site at least twice a year after the initial burying project is completed, preferably in the spring after ice-out and in autumn before winter. The agencies best qualified for investigating the wreck site would be MHM or the OSA. The number of wreck visitations should increase as time goes on and the chances of the wreck becoming exposed rises.

- Once it is determined that the *Essex* is uncovered prompt action should be taken to re-bury the wreck. The organization involved in re-burial would be either the USACE during a harbor renewal project or a contractor.
- The wreck must be uncovered and re-documented every 5 years to monitor any changes in her structure and then re-covered.

Discussion: Advantages and Disadvantages of Option 1

The major advantages of Option 1 are that the USS *Essex* wreck would be protected from wave action, ice movement, and human vandalism and financial costs of this option are relatively small. Hiring a contractor to bury the wreck would be the major expense in this option since in the past the USACE covering of the wreck was a by-product of harbor dredging projects. However, since the USACE harbor renewal projects are not conducted on a regularly scheduled basis, a contractor may have to be hired once the wreck becomes exposed. Nevertheless, while protecting the wreck is necessary, this option is not desirable. The protection provided by the sand is only temporary, and for burying to effectively protect the wreck the *Essex* would have to remain completely covered at all times. Natural wave and ice action will eventually uncover the *Essex*, and during that process of uncovering the wreck will be not only be subjected to wave and ice damage, but also to the eroding effect from the sand washing across the hull. Furthermore, to ensure survivability the wreck would have to remain essentially hidden from the public and from further academic study. Option 1 is antithetical to the ASA, which stipulates that states should “guarantee recreational access to shipwrecks” (Abandoned Shipwreck Act 1987, Section 4, a-2-B).

Option 2: Move the USS *Essex* to a deeper location in Lake Superior

This option will involve the removal of the USS *Essex* to another area of Lake Superior, a location that is not far removed from her current site but deep enough to not be affected by wave and ice action. A barge with a crane would be brought in and the wreck fragment lifted off. The *Essex* would then be moved to deeper water and lowered to the bottom.

The necessities of Option 2:

- Funding must be in place before this option is acted upon. Furthermore, the USACE or an engineering firm with experience dealing with marine environments must be contracted to conduct the recovery under supervision of professional Nautical Archaeologists.
- As with Option 1, documentation of the USS *Essex* is a first necessary step in the process. At this point an earthen or sheet metal cofferdam is a mandatory requirement. It would not have to completely encircle the wreck, but built around the lake half of the wreck with the ends anchored into the beach above the water level. The documentation would uncover the wreck in its entirety, except for the

underside of the wreck. The cofferdam would not be designed to keep water out, but to prevent wave action and sand drifting in.

- A lifting frame would be constructed, one whose outer diameter is slightly longer and wider than the *Essex* wreck. The purpose of this frame is to keep the lifting sling ends spaced apart, thus keeping the wreck from being squeezed as if in a vise.
- Two or four support pilings, driven in at either end of the wreck, would be sunk into the sand to support the frame.
- The lifting frame would be brought in by crane, either overland or preferably by barge. The frame would then be placed over the wreck with its ends resting on the pilings.
- Next, a trench will be dug around the perimeter of the *Essex* for the purpose of passing slings underneath it. Starting at one end of the wreck the hull would be dug out from underneath a foot at a time, with slings replacing the sand as hull support. To ensure the wreck has enough support the slings would be spaced one foot apart. Documentation of the outer hull planking would occur at this point.
- Between the slings and the hull a cushioning bag would be fitted. This bag would then be filled with foam that would conform to the shape of the hull. The foam would then set, forming a hard cradle for the *Essex* to rest on. With the ends of the sling attached to the lifting framework the *Essex* would gradually become suspended in the air.
- The stern end of the wreck may need special consideration, for the main structural member, the keelson, is missing from the final 12 feet of the wreck.
- A crane would be brought in again by barge to lift the *Essex* out of her current location. Time would be spent finishing documentation of the underside of the wreck fragment, including the keel and outer hull planking.
- The *Essex* would then be taken far enough off Minnesota Point that would allow her to be free of the ice and wave action. The wreck's new location would require a minimum 30-foot water depth to ensure the *Essex* is safe from ice (Steven Brossart 2010, pers. comm.).
- A trench, 60 feet long by 2 feet wide by 3 feet deep, will have to be dug on the bottom of the lake to accept the keel of the *Essex*. If this step is not completed, the wreck will be tilted on the keel and place strain on one side of the hull.
- After the *Essex* is lowered she would be checked for any damage incurred from transit, and then possibly buoyed. Again, periodic monitoring of the structure of

the *Essex* by MHM or the OSA is recommended. One visit per year would be a sufficient monitoring interval.

Discussion

A significant amount of funds would have to be raised for this option. The lifting frame recovery method outlined here has been used to recover the CSS *Hunley*, and variations of the method have been successfully used on other wrecks like the *Mary Rose* and Brown's Ferry Vessel. One issue is the current (2010) shallowness of the site. If a barge is used, it will have to have a draft of 2 feet or less. Otherwise a channel may have to be dredged to the wreck, unless the sand has washed away to more traditional depths of 3 to 4 feet in the vicinity of the wreck. The minimum 30 feet of water depth can be found 3/4 mile offshore of Minnesota Point. Also, moving the wreck further north by northeast by 1/4 mile would also ensure that the wreck is clear of the Superior entrance channel (National Oceanographic and Atmospheric Administration 2007).

The lifting framework is seen here during the recovery of the Brown's Ferry Vessel from the Black River near Georgetown, SC in 1976 (Steffy 1988, 121).



One additional consideration is the presence of several different species of rare ferns of the genus *Botrychium* that grow on Minnesota Point. Any work that involves hauling equipment overland to the *Essex* will have to take precautions not to injure this plant (Steven Brossart 2010, pers. comm.). The DNR will also need to be consulted to ensure any other plant or animal life will not be adversely impacted.

Advantages and Disadvantages of Option 2

This option will remove USS *Essex* the shallow water where she suffers from wave and ice damage. Option 2 will also reduce the effects of sand movement on the wreck's wooden fabric. The possibility of vandalism will be reduced but not eliminated. Moving the wreck will result in her removal from the NRHP, but since her new location will not be entirely different from the old, the *Essex* can be easily re-nominated and returned to the NRHP. An option to consider would be the creation of a Duluth Area National Historic Shipwreck District that would include the wrecks of the passenger steamer

Winslow in Duluth Harbor, the whaleback *Thomas Wilson*, the tugboat *Amethyst*, another unidentified tug further north along Minnesota Point, and the USS *Essex*, all in Lake Superior. However, implementing Option 2 would only allow trained divers to enjoy the wreck, whereas her current shallow water location allows snorkelers to view her, and when the lake is calm *Essex* can be viewed from shore. Further, zebra mussels will become an issue for the wreck with Option 2. Zebra mussels prefer to live in depths of 30 to 40 feet or higher and have made their appearance on the nearby wreck of the *Thomas Wilson* (Minnesota Sea Grant 2009). Once attached to a surface they are difficult to remove and greatly affect the historical integrity of a shipwreck. Another drawback with Option 2 is the potential of damage from boat anchors; the wreck's small size may make it harder to locate for sport diving purposes, unless a buoy is maintained on site, and often dragging a boat anchor along the bottom is used to locate dive sites. In all, this option may preserve the wreck from immediate threats but like Option 1, it does not prevent decay but only slows it down. Option 2 actually introduces two new issues that may cause damage to the USS *Essex* - boat anchors and zebra mussels that the very least obscure construction features on the wreck. In all, wreck preservation is only marginally increased over Option 1 and public visibility will be restricted SCUBA divers.

Option 3: Remove the USS *Essex* from Minnesota Point for display outdoors in a wet environment

Option 3 would entail removing the USS *Essex* wreck from Minnesota Point, transporting her to a holding tank at an outdoor venue in Duluth. The tank would serve two purposes as a permanent display and as a possible 'dive tank' for sport divers. An interpretive display would be added to this exhibit and this outdoor venue would ideally be located on the Duluth waterfront.

The necessities of Option 3:

- A significant amount of funding must be secured for this option, including money for staff to engage in preservation, monitoring and security.
- The USS *Essex* wreck site must be documented prior to moving the wreck as outlined in Option 1 and an earthen or sheet metal cofferdam would be utilized.
- The USACE or an engineering firm with experience dealing with marine environments must be contracted to conduct the recovery under supervision of professional Nautical Archaeologists. The method of removal would be as outlined in Option 2.
- Waterfront property must be leased or purchased, or an agreement must be reached with an existing waterfront establishment.
- A secure holding tank must be constructed outdoors.

- An outdoor tank must be constructed to hold a 56-foot by 22-foot by 5-foot hull fragment. The amount of floor space needed for a tank to hold the *Essex* and allow for public viewing is a minimum of 1800 square feet. A minimum tank volume of 9000 cubic feet will be needed to fully submerge the wreck. The wreck would then be placed in the tank, resting on a cradle.

Discussion

Raising the USS *Essex* in one piece is the preferred option, even though there are examples of historic shipwrecks that have been dismantled and recovered in pieces. For example, the disassembly method was used successfully on the 17th century French exploration ship *LaBelle* in Texas. This method has its advantages that, in theory, the *Essex* could be removed without having to bring in a heavy-lift crane and a barge. However, that shipwreck did not have the plethora of metal fasteners as is found on the *Essex*. The *Essex* shipwreck is very strongly constructed, and to dismantle the *Essex* on site would essentially destroy her original fabric and her structural integrity.

There are examples of historic shipwrecks of equal size or larger than the *Essex* that have been successfully raised in one piece including the *Philadelphia*, *Vasa*, *Mary Rose*, the Brown's Ferry Vessel, and the CSS *Hunley*. All these vessels used variations of the lifting system as outlined in Option 2. This system of lifting the wreck intact, though more costly, would be preferred over disassembly. In addition to the tasks outlined in Options 1 and 2 there is the added task of building an outdoor tank and moving the *Essex* to that location. The tank does not have to be much larger than the wreck itself and a tent cover or a shelter roof must be built over the tank for protection and provide cover for visitors. The site will have to be constantly staffed or monitored to prevent vandalism.

Advantages and Disadvantages of Option 3

The advantage of this system would be that the *Essex* is out of Minnesota Point's surf zone and no longer subject to the damaging processes of wind, wave, ice and human action. Further, the wreck can be a tourist draw while being preserved and she can be used for SCUBA dive training that can also include teaching underwater mapping techniques used by nautical archaeologists that would instilling a preservation ethic into the diving community which would be of great benefit to the preservation of Minnesota's maritime heritage. Furthermore, in theory the added costs of actively *conserving* the wreck would be avoided so long as she is kept *preserved* in her current wet state.

However, there are many disadvantages to Option 3 as well. The holding tank location would need to be constantly monitored to secure it from vandalism and a fence would be a mandatory feature in this option. Another serious issue with this plan is the need for curatorial vigilance to keep the wreck from icing up during the winter months. An air bubbler system may keep the ice from forming over the tank, but additional heating and tank wall insulation will be needed to keep the tank from turning into a block of ice. Digging the tank into the ground will help, but the wreck will need styrofoam insulation

over the top to keep it above freezing. Curatorial vigilance will also be needed during the summer months to ensure the water stays cold and mildew-free. Further, even with a tent canopy or roof over the tank, detritus will be blown into the tank and aquatic insects would be another issue requiring attention.

An outdoor wet exhibit may be relatively inexpensive to construct, but the maintenance costs would be very high due to the constant attention needed to ensure that *Essex* is preserved in perpetuity. Option 3, displaying the USS *Essex* outdoors in a tank, should be avoided.

Option 4: Display the USS *Essex* outside dry and fully conserved

After spending a period of time, approximately 10 years, in a conservation tank the USS *Essex* wreck would be displayed outdoors at a waterfront venue.

The necessities of Option 4:

- A significant amount of funding must be secured for this option, including money for staff and infrastructure to conserve the USS *Essex*.
- The USS *Essex* wreck site must be documented prior to moving the wreck as outlined in Option 1 and an earthen or sheet metal cofferdam would be utilized.
- Waterfront property must be leased or purchased, or an agreement must be reached with an existing waterfront establishment.
- The USACE or an engineering firm with experience dealing with marine environments must be contracted to conduct the recovery under supervision of professional Nautical Archaeologists. The method of removal would be as outlined in Option 2.
- A conservation lab large enough to hold an indoor tank for conserving the *Essex* wreck must be constructed or located.
- Once moved, the *Essex* would be placed in the conservation lab for approximately 10 years of conservation treatment.
- An outdoor location must be selected, preferably along the waterfront, and a canopy or roof would be required to ensure preservation of this large maritime artifact.

Discussion

As with the other options above, the display location would need to be a long-term one, perhaps a waterfront park or on the grounds of the GLA or the DECC. The wreck herself would be displayed on wood or concrete stands, which need to be placed in such a

manner as to prevent sagging. Interpretive kiosks telling the history of the *Essex* and of Donald McKay would be built next to the wreck. Construction costs would not be as extensive as it would be for a purpose-built structure. Although an expensive indoor conservation tank is a mandatory requirement for Option 4, opening the lab to tourists during the conservation process could mitigate some costs.

Advantages and Disadvantages of Option 4

The USS *Essex* will need to have undergone a lengthy period of conservation and will have reached a state where she could be viewed as a dry nautical artifact. She would be easily seen at all angles by the public and would be a draw for nautical enthusiasts. The advantages of Option 4 are outweighed by the disadvantages and it is the least attractive option in terms of preserving the *Essex*.

Outdoor displays are detrimentally affected by the weather and at the very minimum a canopy or roof will be needed to cover the *Essex*. This author has seen similar shipwreck fragments displayed out in the open in North Carolina, where they are set up and then essentially left to rot. While outdoor settings have been used to display ship remains elsewhere in the country, it does require a higher level of curatorial vigilance to ensure that the remains are not ultimately damaged or destroyed. Specific examples, like the USS *Cairo* and the CSS *Neuse*, still struggle with conservation issues due to their exposed nature, even though there is a roof or canopy stretched over these wrecks. The constant struggle against the elements will take their toll. Any artifact conserved with the sucrose bulking method, the preferred process that would be used on the USS *Essex*, needs to be kept in a humidity-controlled environment where the humidity is kept under 70%; any higher and the sucrose can leach out of the wood (Hamilton 1996, 29).

While a canopy or shelter roof does help protect against the weather, it doesn't prevent insects, small animals, and birds from taking up residence. Furthermore, insect damage would be extremely likely since the *Essex* would undergo sucrose bulking. Trying to prevent insects from attacking what would essentially be a huge piece of rock candy would be difficult in an outdoor setting. Constant curatorial vigilance, coupled with insecticide spraying, would be required for this option. A fence would also be mandatory to ward off vandalism.

Two other shipwrecks that were initially displayed outdoors, the CSS *Jackson* and the CSS *Chattahoochee*, were ultimately moved indoors in 2001. Plans are currently (2010) underway to build an enclosed display area for the CSS *Neuse* while the USS *Cairo* will continue to sit outdoors under a canopy because it was determined that constructing and maintaining a building large enough to house the ironclad is beyond the finances of the National Park Service (Ballin 2000; Dakota State University 2002; North Carolina Office of Archives and History 2010). With these issues in mind, outdoor display and storage of the *Essex* will be detrimental to the survival of this unique artifact, and is not recommended.

Option 5: Remove the USS *Essex* from Minnesota Point and display her in an indoor wet environment

Option 5 would entail removing the *Essex* from Minnesota Point and transporting her to a holding tank at an indoor venue, ideally on the Duluth waterfront. As with the other options, the tank can serve two purposes. Firstly, it will house the permanent wet display of the *Essex* and secondly it can function as a 'dive tank' for sport divers to explore the *Essex* more closely in a controlled environment. Additional interpretive displays detailing the history of the *Essex* would also be included in the exhibit.

The necessities of Option 5:

- A significant amount of funding would have to be secured for this option, including money for staff to engage in preservation monitoring.
- The USS *Essex* wreck site must be documented prior to moving the wreck as outlined in Option 1 and an earthen or sheet metal cofferdam would be utilized.
- The USACE or an engineering firm with experience dealing with marine environments must be contracted to conduct the recovery under supervision of professional Nautical Archaeologists. The method of removal would be as outlined in Option 2.
- Waterfront property must be leased or purchased, or an agreement must be reached with an existing waterfront establishment.
- An indoor holding tank must be constructed, either inside an existing building or in a purpose-built structure. The structure must hold a be able to easily hold a tank that will accommodate a 56-foot by 22 foot by 5-foot hull fragment. The amount of floor space needed for a tank to hold the *Essex* and allow for public viewing is a minimum of 1800 square feet. A minimum tank volume of 9000 cubic feet will be needed to fully submerge the wreck. The wreck would then be placed in the tank, resting on a cradle.

Discussion

If an existing building cannot be located along the Duluth waterfront, there is the possibility of building a structure dedicated to the preservation of the *Essex*. The small size of the wreck (56 ft x 22 ft) would facilitate such an endeavor, with a minimum of 1800 square feet to accommodate the tank and leave enough space for the public to view the wreck. A corner of a waterfront parking lot could be converted for use as a location for a holding tank, either above ground or dug into it. Supports for the hull of the *Essex* to rest upon would be a feature inside the tank. The building itself need not be an elaborate affair, just large enough to hold the *Essex* inside her holding tank, plus room for visitors and interpretive displays. Insulation and heating for the winter months

would only need to be enough keep the tank above freezing; cold water is desirable since it prevents bacterial growth.

In considering Option 5, decision must be made early whether the tank will be used exclusively for preserving and displaying the *Essex* or whether it will be doing double duty as a SCUBA diver training site. A tank used for diver training would have to be at least 10-15 feet deep, with viewing windows along the side. A tank that is used only to display the *Essex* could be much shallower. Either way, the water in the tank should be kept as cold as possible, and the water periodically changed and treated with a fungicide to prevent bacterial growth and ensure the preservation of the *Essex*. During the winter a special effort would have to be made to prevent the tank water from icing over; curatorial vigilance and periodic monitoring will be necessary.

Advantages and Disadvantages of Option 5

The main advantage of Option 5 would be that the USS *Essex* would be out of the surf zone on Minnesota Point and no longer subject to the damaging processes of wind, wave, ice and human action. Further, being on display in a clear water tank would put the *Essex* more in the public eye than she would ever be on Minnesota Point. She would be a tourist draw while also being secure and preserved. In addition, if the tank and wreck are used for SCUBA dive training, novice divers can practice such things as proper buoyancy control while viewing a historic shipwreck, paying heed to the importance of this skill in order to not damage other wreck sites they may dive in the future. Underwater mapping techniques used by nautical archaeologists could also be taught, thus helping to instill a preservation ethic into the diving community which would be of much benefit to the preservation of Minnesota's maritime heritage. Beyond these advantages, security would be better within a building and maintaining the preservation solution would be much easier.

However, finding an existing long-term public viewing location large enough to hold an indoor tank will be problematic. The logistics of moving the wreck indoors of an existing building is also a factor to consider. A purpose-built structure may be an easier option, with a minimum of 1800 square feet to accommodate the tank and leave enough space for the public to view the wreck. The building would only require minimum heating during the winter to keep the tank from freezing up. Option 5 is, from a preservationist standpoint, the second-best option for preserving the *Essex* and would also be one of the more expensive options. From a nautical archaeological standpoint, however, it is the best option for preserving the wreck's integrity as an 'underwater site' that can also be used as a teaching tool to educate the diving public.

Option 6: Display the USS *Essex* indoors, dry and fully conserved

Option 6 would be the most favorable course of action in terms of preservation. The ultimate goal of this option would have the *Essex* wreck displayed fully conserved, out of the water in a climate-controlled building, and viewable from all angles. She could be displayed with a models of the ship as originally built and as she appeared through the

different stages of her working life, along with interpretive labels detailing the maritime history, construction, and significance of Donald McKay's USS *Essex*.

The necessities of Option 6:

- A significant amount of funding would have to be secured for this option, including money for a building to properly conserve the wreck and money for staff to engage in conservation monitoring.
- The USS *Essex* wreck site must be documented prior to moving the wreck as outlined in Option 1 and an earthen or sheet metal cofferdam would be utilized.
- The USACE or an engineering firm with experience dealing with marine environments must be contracted to conduct the recovery under supervision of professional Nautical Archaeologists. The method of removal would be as outlined in Option 2.
- Waterfront property must be leased or purchased, or an agreement must be reached with an existing waterfront establishment to ultimately display the *Essex*.
- A long-term conservation lab large enough to house the *Essex* in her conservation tank must be established. It will need to be indoors for maximum effectiveness of the conservation process – which could last 10 years – and this lab could also be the permanent display location.
- If it is determined that the lab space will not be the ultimate display site for the *Essex*, an existing venue that would display the *Essex* indoors must be secured or a structure must be constructed to display the conserved artifact.

Discussion

Option 6 is the best choice for long-term preservation and interpretation of the USS *Essex* wreck. The *Essex* would be out of the elements and in a climate-controlled building, she would be set up on stands and viewable from all angles, and her small size makes finding a place to display her in an existing waterfront building a real possibility. There are two waterfront businesses that have expressed interest in displaying the *Essex* indoors once she is fully conserved, but securing funding to place the *Essex* within these structures will be needed, as well as funding to ensure her interpretation to the public.

Alternately, a purpose-built structure dedicated to displaying the *Essex* may be an option, albeit a somewhat expensive one. However, the *Essex* wreck is relatively small, an advantage when constructing a new building to house her. The display building must be insulated enough to maintain climate control within. Constructing a display building will not be necessary if the structure or location used to conserve the *Essex* is converted into her display location. It must be noted that Option 6 could be implemented

even after the full implementation of Option 5; the holding tank could simply be converted to a conservation tank, even after several years of the wreck's wet display and dive training. If Option 6 is ultimately chosen to secure the USS *Essex*, the wreck could still be viewed while her waterlogged timbers are being conserved with sucrose bulking or other conservation treatments. Additional tank heaters would be needed for the conservation process and minimum conservation time of 10 years would be expected.

Option 6 would be the most expensive plan to implement for the preservation and conservation of the USS *Essex*. However, it would produce a very unique display, and would ensure the preservation of what is probably the most historically significant shipwreck in Minnesota waters – the only surviving example of a Donald McKay-built ship, and the only surviving example of a post-Civil War wooden US Navy warship known to exist.

The USS *Essex* and the National Register of Historic Places

Congress created the NRHP program in 1966 as a means of identifying historic treasures of America's past and to encourage their preservation. The NRHP was eventually expanded to include such properties as vessels, shipyards, canals, and other maritime-related structures. The NRHP provides uniform criteria for evaluating significance and integrity in historic vessels, and listing affords a measure of protection by recognizing maritime resources that are worthy of preservation. Objects listed on the NRHP are given some protection from Federal projects that may impact the object's integrity. Federal funding may also be available for objects listed on the NRHP.

National Register Bulletin #20 states that a vessel's significance is based on her representation of vessel type and her association with significant themes in American history. To meet the requirements for NRHP eligibility a vessel must "be significant in American history, architecture, archaeology, engineering or culture, and possess integrity of location, design, setting, materials, workmanship, feeling, and associations." To be considered significant, the vessel must meet one or more of the four NRHP criteria:

- A: [The vessel is] associated with events that have made a significant contribution to the patterns of our history; or
- B: that are associated with the lives of persons significant in our past; or
- C: that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D: that have yielded, or may likely to yield, information important in prehistory or history" (National Park Service 1992).

The USS *Essex* wreck site was placed on the NRHP in 1994, having satisfied Criterion A, C, and D. The reasoning behind Criterion A states that *Essex* exemplifies the last of the wooden-hulled, sail powered ships of the US Navy during a period of technical transformation. Under Criterion C, *Essex* is an example of the work of noted shipwright Donald McKay and probably the only surviving example of his work. The *Essex* satisfies Criterion D in that her remains "can yield specific data relative to construction methods and materials for one of the last wooden, fighting sailing-ships built for the US Navy, a vessel which was built by one of the masters of 19th Century ship construction" (James 1992, 41).

Normally a structure listed on the NRHP loses its status when it is moved, since it loses its integrity of location, setting, and feeling, although there can be exceptions for special cases like a ship. If a vessel's original location in the water is threatening to her very existence, then she can be brought out of the water and displayed in a waterfront

setting (National Park Service 1992, 8-9). In the case of the USS *Essex*, a strong argument can be made for her being re-listed on the NRHP after she is moved from the Minnesota Point surf zone. In regards to the six options presented above, NRHP concerns are:

- Option 1: No NRHP de-listing occurs because the *Essex* remains in place in the waters of Minnesota Point.
- Option 2: The *Essex* is not far removed from her original location and she may be de-listed for the duration of the move, but her re-nomination is probable.
- Options 3-6: The *Essex* would have to be de-listed for the duration of the move to a new location. For the purposes of re-listing, it is imperative that the *Essex* is ultimately located in a waterfront setting.

It is the opinion of this author that, if the *Essex* is moved, that she be located in the Duluth waterfront area so that she can be re-listed on the NRHP. An NRHP listing could benefit the display location owner or the owner of the *Essex* (if the title of the *Essex* is transferred from the State of Minnesota) in that it could qualify them for Federal tax credits or for Federal grants.

The USS *Essex* as a National Historic Landmark

National Historic Landmarks are buildings, sites, districts, structures, and objects that have been determined by the Secretary of the Interior to be *nationally* significant in American history and culture. Eligibility for NHL status is similar to that of the NRHP in that the landmark in question be significant in American history, architecture, archaeology, engineering or culture, and possess integrity of location, design, setting, materials, workmanship, feeling, and associations. The criteria for determining NHL status are similar to the NRHP:

- 1. That is associated with events that have made a significant contribution to, and are identified with, or that outstandingly represents, the broad national patterns of United States history and from which an understanding and appreciation of those patterns may be gained; or
- 2. That are associated importantly with the lives of persons nationally significant in the history of the United States; or
- 3. That represent some great idea or ideal of the American people; or
- 4. That embody the distinguishing characteristics of an architectural type specimen exceptionally valuable for the study of a period, style or method of construction, or that represent a significant, distinctive and exceptional entity whose components may lack individual distinction; or
- 5. That are composed of integral parts of the environment not sufficiently significant by reason of historical association or artistic merit to warrant individual recognition but collectively compose an entity of exceptional historical or artistic significance, or outstandingly commemorate or illustrate a way of life or culture; or:
- 6. That have yielded or may be likely to yield information of major scientific importance by revealing new cultures, or by shedding light upon periods of occupation over large areas of the United States. Such sites are those which have yielded, or which may reasonably be expected to yield, data affecting theories, concepts and ideas to a major degree. (National Park Service 2010)

It is the opinion of this author that Criterion 2 would have the greatest influence in achieving NHL status for the USS *Essex*. The *Essex* is an example of a Donald McKay-built vessel, McKay being one of the most famous and influential shipbuilders of this nation. McKay-designed and built clipper ships were world-renown, and their achievements a source of national pride. The *Essex* remnants are the only confirmed surviving relic out of the 69 ships constructed by this master shipbuilder. In the opinion of this author, NHL status should be sought for the *Essex*, whether she remains in place or is moved to a more protected location.

Conservation Methods

At this point few notes about conserving the USS *Essex* wreck are appropriate. The conservation process is a time consuming and expensive procedure that will easily overshadow the cost of recovery. Yet it must be planned and budgeted for, otherwise the recovery of the *Essex* will have been a pointless exercise resulting in an extremely expensive form of vandalism.

The metal incorporated into the hull of the *Essex* consists of copper alloy fasteners and one iron or steel pipe. The metal fasteners should not be removed; doing so would destroy the original fabric of the ship. Copper alloy artifacts, especially those recovered from fresh water, tend to be in a fine state of preservation, with little concretion or active corrosion. Mechanical cleaning of the exposed portions of metal with dental picks or toothbrushes should be sufficient, if needed at all. Copper's natural patina should be adequate protection, and a sealant may not even be needed to cover the exposed portions of the fasteners. In fact, there is subjective evidence that suggests sucrose bulking (the preferred treatment of the wood) will actually inhibit any metal corrosion (Rodgers 1992, 122). The metal pipe will need more time-consuming treatment, however, and determining if it is wrought iron, cast iron or steel will be required before a treatment is decided upon. Possible preservation treatments are electrolytic reduction or careful mechanical cleaning followed by coating the pipe with CRC 3-36, a solvent inhibitor that can coat the metal and create a barrier against oxygen and moisture (Singley 1988, 52-53).

The wood of the *Essex* is waterlogged and rapid drying of the wreck's timbers without any treatment will cause the wood's cells to collapse and result in considerable shrinkage and distortion. Before conservation starts several factors must be considered including the wood type, cellular condition, water content, the size of the *Essex*, and where she will be displayed. This technical information will assist researchers in the determination of the type and length of the conservation process. Conserving waterlogged wood is done by one of two methods. The first incorporates a material into the wood cells that consolidates and gives mechanical strength to the wood as the water is removed (bulking) and the second process removes excess water by methods that prevent shrinking of the wood (freeze drying or solvent drying). Solvent drying involves using such compounds as Acetone-rosin, alcohol-ether or camphor-alcohol. Such chemicals may be effective in penetrating hardwoods, but the amount of chemicals needed to immerse the *Essex* would create a huge fire hazard. Freeze drying is mainly used for small artifacts for practical reasons – the cost of building and operating a freezer to hold the *Essex* would be prohibitive.

The preferred method of conservation for the USS *Essex* wreck is bulking. Two types of bulking treatments are available – polyethylene glycol (PEG) and sucrose. PEG has been used successfully in preserving waterlogged wood, the most famous applications being the 1511 English warship *Mary Rose* and the 1620 Swedish warship *Vasa*. However, PEG has two major drawbacks – the basic chemical is expensive and it is corrosive to all metals. A conservation tank for the *Essex* would have to be constructed

of waterproofed concrete, stainless steel, or plexiglass, and unfortunately, PEG would corrode all the copper alloy fasteners incorporated into the wreck's hull.

The sucrose method of conserving waterlogged wood is a much cheaper alternative to PEG, is as effective as PEG, and it does not corrode metal. Fermentation is an issue so a biotic inhibitor such as Lysol must be added to the sucrose solution. Sucrose bulking is most effective when the solution is heated and agitated. It is recommended that a tank heater and four tank stirrers – trolling motors – be utilized during sucrose bulking.

Basic conservation treatment involves periodically weighing the *Essex*, since weight gain is an indicator of bulking agent penetration. The *Essex* would be submerged with water and then the sucrose added, achieving a 10% solution. The tank heater would be set to 110 degrees, the stirrers set on low, and a cover put over the tank. An increased amount of sucrose would be gradually added to the water over the following months until a 50% solution is reached. This level is then maintained until the weight gain has stabilized, indicating that enough bulking agent has been absorbed. A large artifact like the USS *Essex* may take years to stabilize.

When the bulking is complete, the conservation tank will be drained and essentially turned into a humidity chamber. Starting at 100% relative humidity, the tank will be allowed to gradually dry out over the course of several months, until a relative humidity of 50% is reached. Then the cover would be taken off and the *Essex* allowed to air dry. When put on display the *Essex* should be kept in 30 to 40 percent relative humidity.

The total amount of time the USS *Essex* would need to spend in the sucrose bulking solution is unknown. The size of the wreck, her wood type, and the cellular condition of the wood will affect time spent in the conservation tank. Ten years is a ballpark figure based on the experiences of the *Vasa*, *Mary Rose*, the Brown's Ferry Vessel and the Sea of Galilee Wreck. Further research on the wreck is needed for a more accurate assessment of conservation time.

References: Hamilton 1995, Rodgers 1992, and Singley 1988.

Conclusions

The USS *Essex* was never involved in any major battles. Born in a time of great technological change, she was virtually obsolete from the moment of her launch. The Industrial Revolution was in full swing, steam power was rapidly replacing wind power, iron and steel replacing wood for ship construction, and armor plating was seen as an indispensable part of a warship's make-up for defeating shell firing guns. The Navy she belonged to was fraught with stagnated thinking. However, the USS *Essex* has several unique claims to fame. The *Essex* was among the last wooden-hulled auxiliary sail powered warships of the US Navy. She is the last and the longest-lived of her class. The *Essex* is the only post-Civil War wooden hulled Navy ship known to exist and she is the only Navy wreck in Minnesota waters. Most importantly, in a national sense, the *Essex* is the last product of a legendary shipbuilder Donald McKay. Any serious US maritime history book will mention McKay and his clipper ships, which were world-renowned. For a brief period in the 1850s, when McKay's shipyard was the most active, the United States came close to eclipsing the shipping dominance of Great Britain.

After a 55-year career the USS *Essex* was ignobly burned for the metal in her hull, and her remains have languished on Minnesota Point for decades. From the earliest known photograph in 1988 to the present day these remains have undergone slow but steady decay. To let the only known fragment of a McKay-built vessel fade away in the surf zone of Minnesota Point is tragic. It is hoped that this paper outlining ways to preserve the *Essex* can serve to guide future efforts to safeguard this significant piece of America's maritime heritage.

Archival Sources

The following items were located during MHM's research trip on April 26 to May 7 2010 to the NARA in Washington, DC, College Park, MD, and Chicago, IL, the Naval Historical Center (NHC) at the Washington Navy Yard, and the Nimitz Library at the US Naval Academy. They are presented here as an aid for future research on the USS *Essex*.

NARA, College Park, MD: USS *Essex* Hull, Sail, and Equipment Plans, RG 19

April 24, 1875

- Plan of Spars & Sails for Sloop of War "*Essex*," to be fitted by Donald McKay at Boston

June 12, 1886

- Docking Plan and Section (on 4 sheets, one duplicate), RG 19, from MF 32144-1, "Hull Plans of Stricken Vessels", IX-10

June 12, 1886

- Rudder, RG 19, from MF 32144-1, "Hull Plans of Stricken Vessels", IX-10

April 1890

- Profile Outboard (on 3 sheets), RG 19, from MF 32144-1, "Hull Plans of Stricken Vessels", IX-10
- Sail Plan (on 2 sheets), RG 19, from MF 32144-1, "Hull Plans of Stricken Vessels", IX-10
- Berth Deck and Hold (on 5 sheets, one duplicate), RG 19, from MF 32144-1, "Hull Plans of Stricken Vessels", IX-10
- Berthing Plan, Gun Deck (on 3 sheets), RG 19, from MF 32144-1, "Hull Plans of Stricken Vessels", IX-10
- Longitudinal Elevation (on 3 sheets, 6 duplicates), RG 19, from MF 32144-1, "Hull Plans of Stricken Vessels", IX-10
- Berth Deck and Hold, Poor Plan, RG 19

March 10, 1896

- Smoke Pipe (one duplicate), RG 19, from MF 32144-1, "Hull Plans of Stricken Vessels", IX-10

October 1896

- Hawse Blocking and Details of Fittings (on 2 sheets), RG 19, from MF 32144-1, "Hull Plans of Stricken Vessels", IX-10

November 1896

- Scuttle for Berth Deck Ventilation, RG 19, from MF 32144-1, "Hull Plans of Stricken Vessels", IX-10

- Alterations in Ward Room Hatch Canopy, RG 19, from MF 32144-1, "Hull Plans of Stricken Vessels", IX-10

1910 Toledo Shipbuilding Company Blueprints.

- Outboard Profiles.
- Arrangement of Electric Lights.
- Boiler Room plan.
- Side View Babcock and Wilcox boilers.
- Engine room floor plans.
- Deck plans.
- Propeller drawing.
- Engine side views.

NARA, Washington, DC: USS *Essex* Manuscripts

Record Group 19, Bureau of Construction and Repair

- Appraisals of lost or destroyed *Essex* equipment, May - June, 1911. File #11257.
- Bureau of Construction and Repair, General Records of Chief of Bureau; sailing and other qualities of vessels, 1874-1886; sailing qualities reports. Vol. 2 through 6. These are reports detailing sailing qualities of navy ships including *Essex* under various circumstances. E 244.
- Correspondence: Chief of Bureau to Secretary of the Navy, Re: maintenance costs, November 13, 1885. E 963,
- Correspondence: Chief of Bureau to Secretary of the Navy, Re: maintenance costs, November 20, 1885. E 963
- Correspondence regarding repairs: bilge pumps, steam launch cradles, fore topsail yard, berth deck caulking, etc., February 13, 1896. File # 437.
- Correspondences regarding changes made to interior layout as requested by Commander Strong. February & March, 1896. File # 817.
- Correspondence regarding survey done while *Essex* was in England. Also communication regarding rebuilding the spar deck and alterations to boiler uptakes. Included are the number of cadets and stores the ship can carry. March – August 1896. File #1187.
- Correspondence regarding planking the new spar deck, the results of several hull surveys, anchor engine overhaul, new hatches and ladders, new officers water closet. Reports also discuss the need to find a more practical way of raising the lower gun port sills. August – November 1896. File #2674.
- Correspondence regarding leaky gun deck, a grounding incident, sanitary report, hull survey report, preparations for transfer over to the Ohio Naval Militia, Ohio Naval Militia issues, work performed by Toledo Shipbuilding Company to improve sanitary conditions, and installation of an electric power plant. Also correspondence regarding caulking and funding problems, December 8, 1898 storm damage, installation of two 4-inch guns, and a damage report following a collision with steamer *Wyandotte*. This file also has the contract with the Toledo Shipbuilding Company for the extensive overhaul performed on the *Essex* in 1911. 1896-1911. File #2280.
- Extensive hull surveys of the *Essex* performed in October 1896, March 1898, May 1900, November 1902, and October 1903. File #2674.

- Portsmouth Navy Yard requesting Bureau of Construction & Repair for information regarding the stability of the *Essex*. December 1903. File #16918
- Report of overall condition of *Essex*, including defects as found in the cruise to Newport RI, November 10, 1898. File #6930.
- Summary of needed repairs, January 24, 1898. File # 437.

Record Group 45, Bureau of Navigation

- Collection of handbooks and flyers outlining drilling exercises, inspections, and other routines for Navy training squadrons. Contains one manual for USTS *Essex*: "Routine for Drilling, Exercising, Instructing, Scrubbing, Cleaning and Inspecting." E464, box 367.
- Compiled Cruising Reports, July 1895 to July 1897, E 421.
- Correspondence regarding movements of *Essex* between 1892 and 1895. Included are captains' itineraries and cruise reports. E 464, box 425.
- *Essex* History. 1876-1879. Reg. of USN Vessels, Vol. 1.
- Location of Militia ships, February 9, 1907. E 464, box 261.
- Register of USN Vessels, April 1875-June 1880.

Microfilm:

- Movements of USS *Essex*, Box 425, OM, 1871-1910.

NARA, Chicago, IL

Record Group 181, 9th Naval District, Miscellaneous Correspondence

- Boards of Inspection of Vessels. Includes USS *Essex*. 1921. Box 352.
- Correspondences of Captain Eaton. Mostly regarding manning the USS *Essex* for the 1921 cruises. He also expresses concern over the ability of *Essex* to keep up with other militia ships. *Essex* is also mentioned in regard to a dry-docking to repair a bad leak. Box 119.
- Correspondences from Captain Eaton regarding finances, discharges, supply requests, and upcoming relief of USS *Essex* by USS *Paducah*. 1922. Box 151.
- Correspondences to / from USS *Paducah* and USS *Essex*, 1922. Box 152.
- Correspondences of Captain Eaton. Mostly about personnel records, inventories, discharges, etc. November - December 1922. Box 153.
- Correspondences of Captain Eaton, January - September 1923. Includes information regarding a heating boiler installed in the *Essex*. Box 194.
- District Vessels. File showing monthly status reports of naval militia vessels, including USS *Essex*. 1917-1919. Box 86.
- Documents concerning the manning of naval militia vessels during times of war. List of militia vessels and their locations. Box 1.
- General File, Material Inspection of ships in 9th Naval District. Includes "scores" given by inspectors to militia ships. 1922 – 1923. Box 207.
- Hull Reports. 1921 hull inspection of the USS *Essex*. Box 109.
- Hull Reports. Recommendation that the USS *Essex* be turned over to the state of Minnesota. 1921. Box 139.
- Hull Reports. Hull inspection report on the USS *Essex*, 1925. Box 321.
- Hull Reports. Report of four hull inspections of USS *Essex*, all in 1929. Box 524.
- List of men arriving or detached from the *Essex*. Box 7.
- Lists of caretakers on various stations and ships including *Essex*. Box 33.
- Requests for Repairs to Vessels. USS *Essex* supplying parts to USS *Paducah*. Box 412.

- “US Naval Forces, 1919”. A summary of all U.S. Navy ships in 1919; *Essex* listed as in commission in ordinary in Chicago. Box 29.
- USS *Essex* and USS *Gopher*. Papers relating to turning over the *Gopher* and *Essex* to the state of Minnesota. Box 60.
- USS *Essex* cruises. Almost entirely correspondence regarding August 1920 training cruise. Box 89.

Naval Historical Center, Washington Navy Yard: USS Essex

USS Essex Files

- Includes 21-page service summary of USS *Essex* from 1876-1900, also contains short historic summaries

Photographs

- **NH 001309**, USS *Essex*, Ship house 4 & 5 and Building #7, Portsmouth, NH, **year wrong - 1890**
- **NH 43832**, USS *Essex* with ship diary entry and roster of officers. Lt. Cmdr. Richard G. Davenport served on board from **Oct. 1876-July 1877**. From sketch by R. B. Dashiell. Courtesy of the Naval Historical Foundation, Davenport Collection
- **NH 43989**, USS *Essex* entering the Port of Le Havre, France while on Special Service on the North Atlantic Station in the **mid-1890s** after being rearmed with 4" BLR guns **in 1893**
- **NH 44799**, Adams Class, Most likely *Essex*
- **NH 44815**, USS *Niagara* starting her Centennial cruise around the Great lakes, at Erie, PA, **July 1913**, USS *Essex* is in the distance.
- **NH 54153**, USS *Essex* at Yokohama, Japan, in **1887** with portraits of ship's officers at that time
- **NH 54291**, USS *Essex*, from the A. S. Murray Collection purchased from Peale Museum, Baltimore, MD, by curator
- **NH 54292**, USS *Essex*, from the A. S. Murray Collection purchased from Peale Museum, Baltimore, MD, by curator
- **NH 54293**, USS *Essex* at the Boston Navy Yard, **August 1876**, with USS *Wabash* in background
- **NH 54297**, USS *Essex* with naval Academy midshipmen at sail drill at Annapolis, MD, **ca. 1893-1896**.
- **NH 54298**, USS *Essex* with naval Academy midshipmen at sail drill at Annapolis, MD, **ca. 1893-1896**
- **NH 55844**, USS *Essex*, Portsmouth Navy Yard, New Hampshire, **ca. 1880s**, Courtesy of N. F. Toczko, Falls Church, VA, 1972
- **NH 63451**, USS *Essex*
- **NH 63536**, USS *Essex* after rearmament with breech-loading guns, **ca. 1890-might be later, near Spanish American War**
- **NH 69191**, USS *Essex* as a Dressed Ship, **29 April 1889**
- **NH 69791**, USS *Essex*, off New York **ca. 1890**
- **NH 75662** USS *Essex*, **1890s**, possibly off the Maine Coast, Courtesy of Mr. Arthur von Maluski, Fall River, MA, 1971
- **NH 75674**, USS *Essex*, during Perry Centennial Naval Parade, **1913**, possibly at Erie, PA, Courtesy of RAdm. Denys W. Knoll, Erie, PA, 1972

- **NH 75675**, USS *Essex*, during Perry Centennial Naval Parade, small steamer Ruth at left, **1913**, possibly at Erie, PA, Courtesy of RAdm. Denys W. Knoll, Erie, PA, 1972
- **NH 79872**, USS *Essex*, Lorain, OH, Courtesy of D. M. McPherson, 1974
- **NH 83184**, USS *Essex* Under Sail, **ca. 1890s**, Courtesy of Capt. Glenn Howell, 1974
- **NH 85595** USS *Essex* Strew Steamer, Artist: Phillips Melville, 1956, Courtesy of Naval Historical Foundation, actual painting accession number: 77-152-A
- **NH 91307**, USS *Essex*, **mid-1890s**, after being re-armed with 4" breech-loading rifles in **1892**. Photo by W. E. Landes, Portsmouth, VA. Courtesy Naval Historical Foundation, Davenport Collection
- **NH 91308**, USS *Essex* in **mid-1890s** after being rearmed with 4" breech-loading rifles in 1893. Photo by W. E. Landes, Portsmouth, VA. Courtesy Naval Historical Foundation, Davenport Collection
- **NH 91870**, USS Niagara with USS *Essex* in background, as well as USS Dorothea, **1913**, Collection of Adm. R. E. Ingersoll. Courtesy of Mrs. A. C. Nagle
- **NH 93841** USS *Essex*, USS Niagara, USS Wolverine (ex-Michigan) in a Great Lakes Port, during the Perry Centennial, **1913**, halftone postcard, Courtesy of Martin Holbrook, 1982

US Naval Academy, Nimitz Library, Annapolis MD

Microfilm:

- Journal of the USS *Essex*. 1877-1878. This is Commander Schley's journal of the first voyage of the *Essex*. 1 role: MS 99
- Letter book of the USS *Essex* (Incoming Correspondence), 1876-1879, 1 role: MS 102
- Letter book of the USS *Essex* (Incoming Correspondence from the Navy Department), 1876-1879, 1 role: MS 103
- Letter book of the USS *Essex* (Outgoing Correspondence), 1876-1879, 1 role, MS 98 Note: This letter book is of poor quality that didn't transfer well to microfilm. Extensive note taking or using a high quality digital camera may be the only recourse for the researcher.

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_____. 1913e. Perry Ship at Put-in-Bay. 21 July.

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_____. 1904d. *Essex Starts for Montreal*. 18 July.

_____. 1904e. *Essex at Montreal*. 22 July.

_____. 1904f. Likes the *Essex*. Capt. McNelly Takes a View of His Training Ship. 23 July.

_____. 1904g. Drowned in Lachine Canal. 26 July.

_____. 1904h. *Essex Left Montreal*. 27 July.

_____. 1904i. *Essex at Ogdensburg*. 30 July.

_____. 1904j. *Essex in Lake Ontario*. 1 August.

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